

# Tamarack

*Larix laricina*



The volume of tamarack has increased dramatically since 1996 with an increase in all size classes, but especially sawtimber. Growth rates have increased in the last 20 years, but mortality which is relatively low, has remained unchanged. Tamarack grows almost exclusively in wet, low quality sites in northern Wisconsin.

Tamarack is not an important timber species, accounting for only 0.1% of roundwood production. Currently, we harvest only 14% of total growth. The density of tamarack wood is the lowest of all tree species which makes it less desirable for biofuel production.

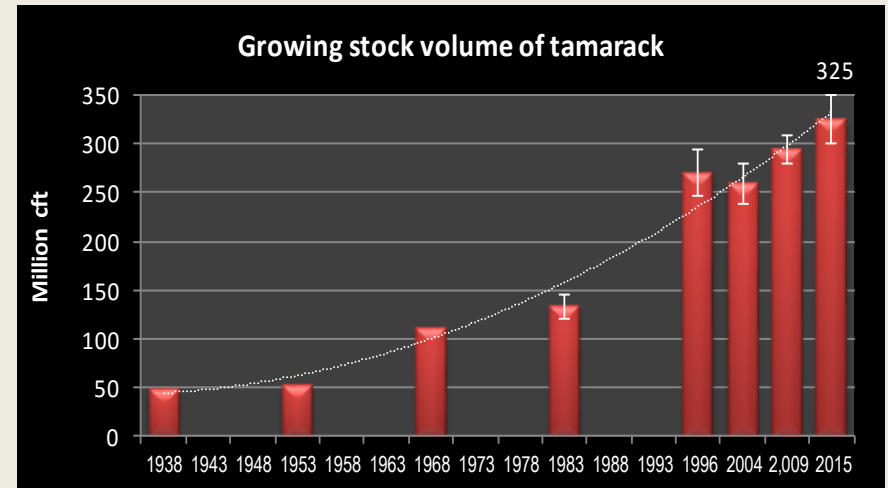
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*"How has the tamarack resource changed?"*  
**Growing stock volume and diameter class distribution**

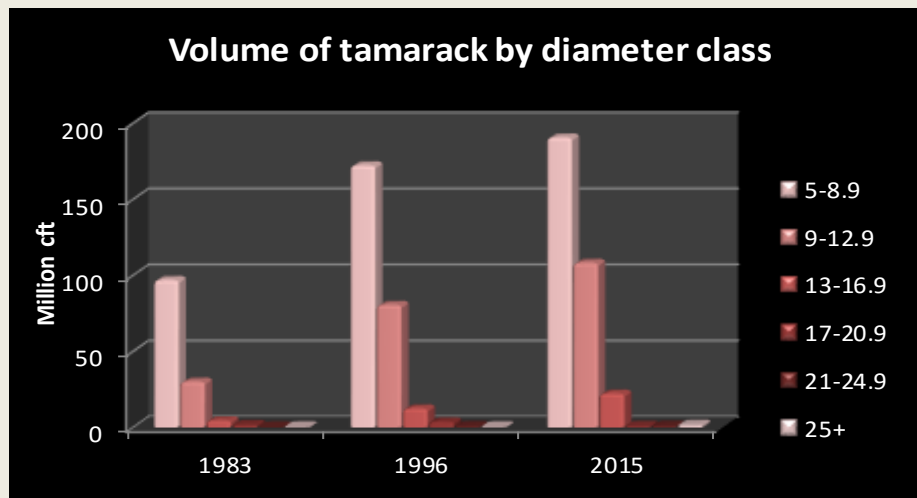
The [growing stock volume](#) of tamarack is about 325 million cubic feet or 1.5% of total statewide volume (chart on right). Volume has risen steadily since 1938 and more than doubled since 1983.

The tamarack resource has aged. For instance, the volume in small trees (5-12.9 inches in diameter) has increased 135% since 1983 whereas the volume in large trees (13+ inches) has more than quadrupled (chart below left).

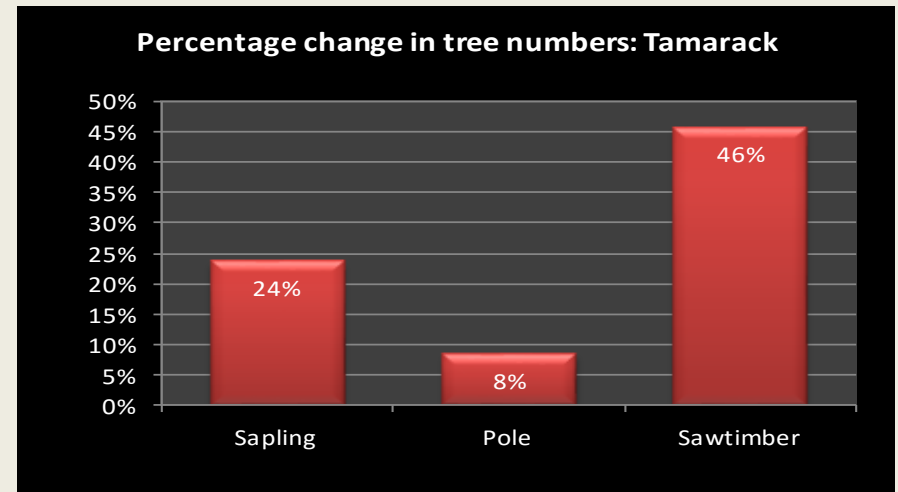
This aging is also reflected in the number of trees by size class (chart below right). The number of [sawtimber-sized](#) trees has increased 46% since 1996 while the number of saplings and poles has increased as well. This suggests that future populations should remain stable.



Growing stock volume (million cubic feet) by inventory year.  
 Source: USDA Forest Inventory and Analysis data



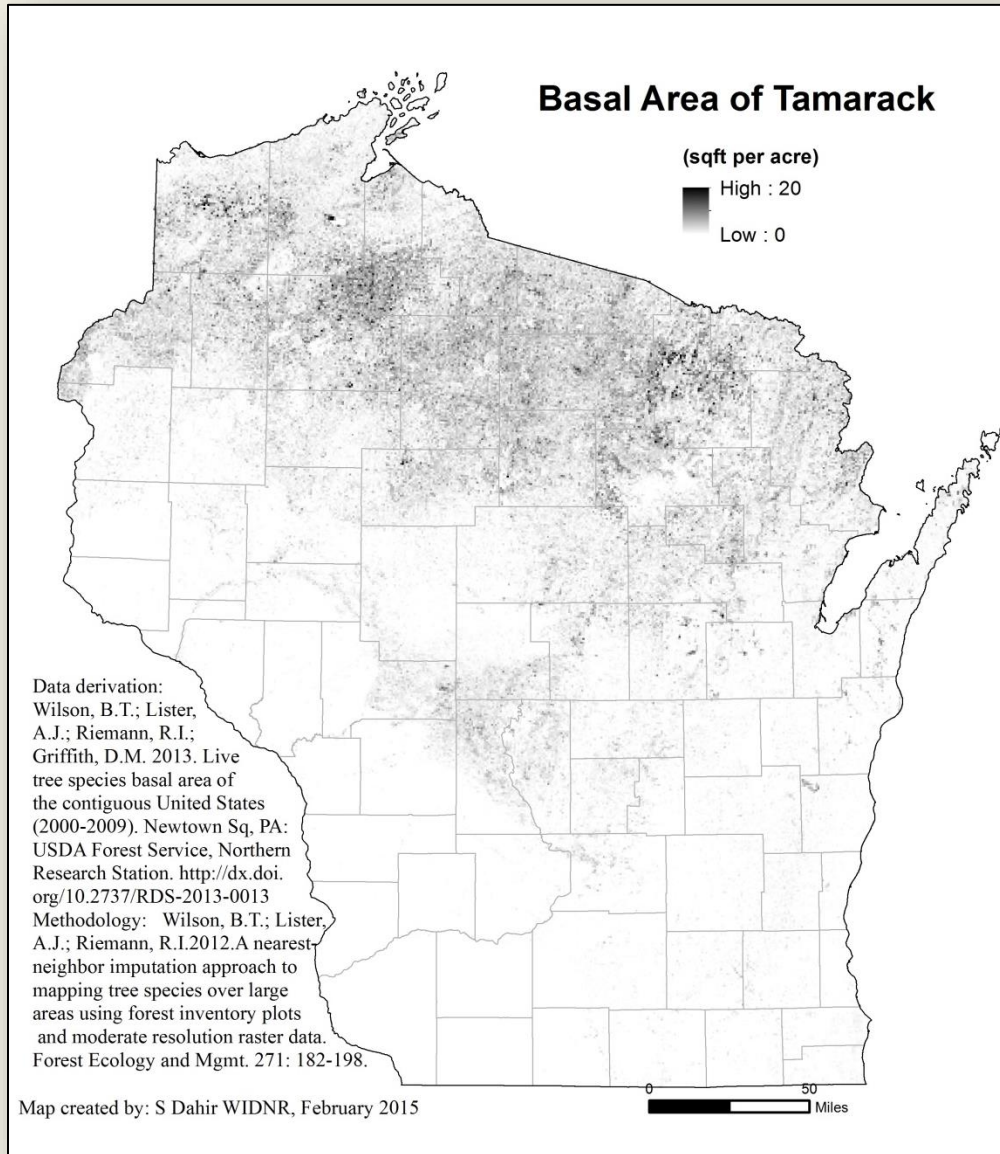
Growing stock volume (trees over 5 inches dbh) by diameter class (inches).  
 Source: USDA Forest Inventory and Analysis data



Percentage change in the number of live trees by size class between 1996 and 2015.  
 Source: USDA Forest Inventory and Analysis data 1996 and 2015.

## *"Where does tamarack grow in Wisconsin?"*

### Growing stock volume by region with map



Over 85% of tamarack growing stock volume is located in northern Wisconsin with 12% in the central part of the state.

The vast majority of volume, 85%, is located on the spruce / fir forest type with much less on the aspen / birch and elm / ash / cottonwood types.

Growing stock volume (million cubic feet) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total
Tamarack	40	135	141	9	1	325
Percent of total	12%	42%	43%	3%	0%	100%

Source: USDA Forest Service, Forest Inventory and Analysis 2015 data

For a table of **Volume by County** go to:

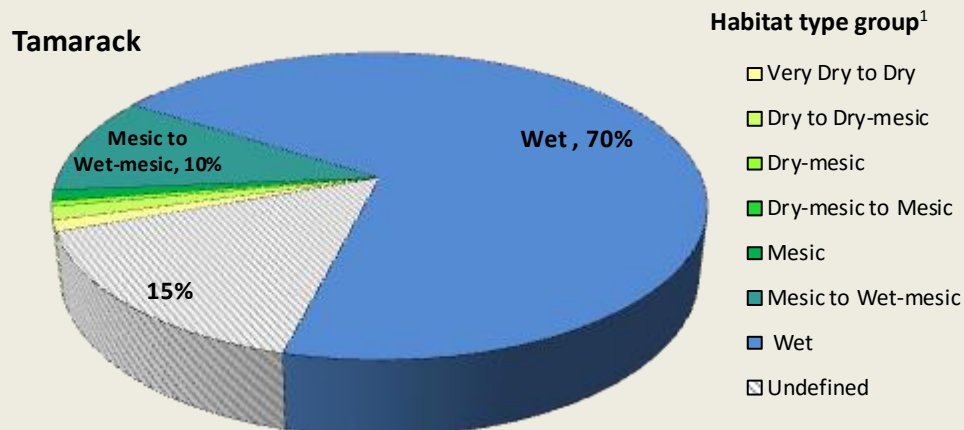
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/VolumeCountySpecies.pdf>



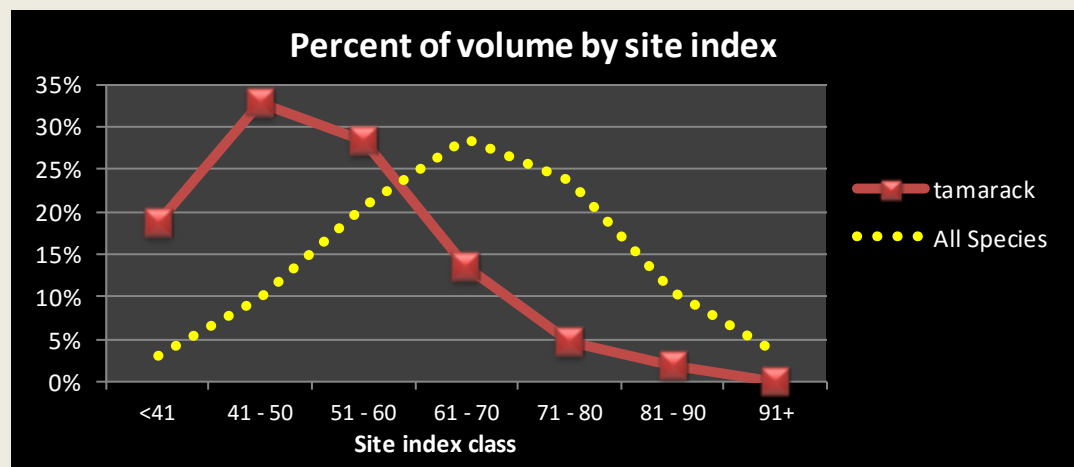
## *"What kind of sites does tamarack grow on?"*

### Habitat type<sup>1</sup> and site index distribution

The vast majority (80%) of tamarack growing stock volume is found on wet habitat types (chart below).



Percent distribution of growing stock volume by habitat type group (USDA Forest Inventory & Analysis data).



Percent distribution of growing stock volume by site index class (USDA Forest Inventory & Analysis data).

The majority of tamarack growing stock volume is found on wet sites in the northern part of the state. These forests have some of the lowest site index values of all timberland (chart on left). Over 80% of volume is located in stands with a site index below 60.

The average site index by volume for tamarack is 51, much lower than the average for all species, 66. Tamarack grows on some of the poorest soils in the state.

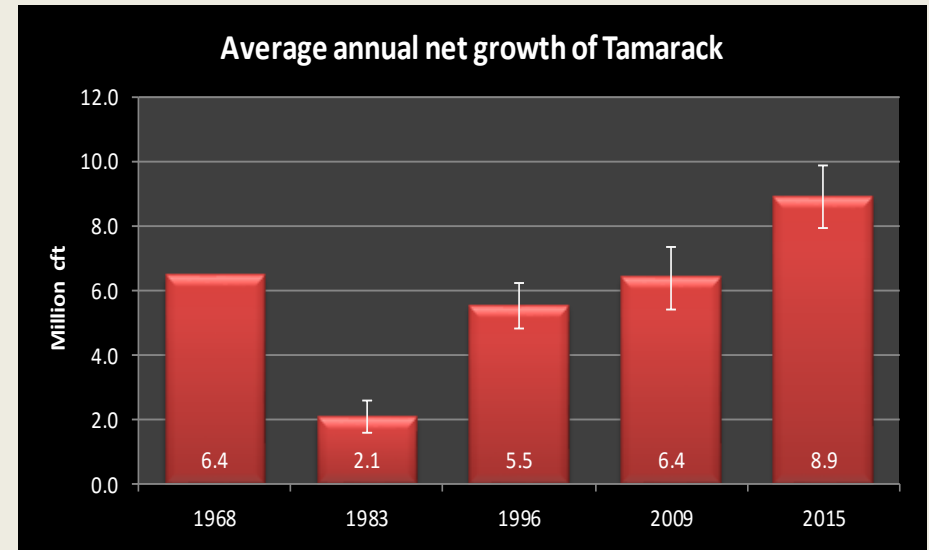
<sup>1</sup> For more information on habitat types see Schmidt, Thomas L. 1997. Wisconsin forest statistics, 1996. Resource Bulletin NC-183. St. Paul, MN: U.S. Dept. of Agriculture, Forest Service, North Central



*"How fast is tamarack growing?"*

### Average annual net growth and ratio of growth to volume

Average annual net growth of tamarack was about 8.9 million cubic feet per year from 2010 to 2015 and accounts for 1.5% of total statewide growth (chart on right). The growth rate has increased by over 60% since 1996.



Average annual net growth (million cubic feet).  
Source: USDA Forest Inventory & Analysis data

Average annual net growth (million cubic feet/year) and ratio of growth to volume by region of the state.

Region	Net growth	Percent of Total	Ratio of growth to volume
Northeast	4.5	54%	3.3%
Northwest	3.4	41%	2.5%
Central	0.7	8%	1.7%
Southwest	0.0	0%	4.1%
Southeast	-0.2	-2%	-2.4%
Statewide	8.3	100%	2.6%

Source: USDA Forest Inventory and Analysis

The highest volume growth for tamarack is in the northern part of the state. Net growth in southeast Wisconsin may be negative due to high mortality but sampling error is very high.

The average ratio of net growth to volume for tamarack is 2.6%, equal to the statewide average of 2.7% for all species.

For a table of **Average annual growth, mortality and removals by region** go to:

<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>

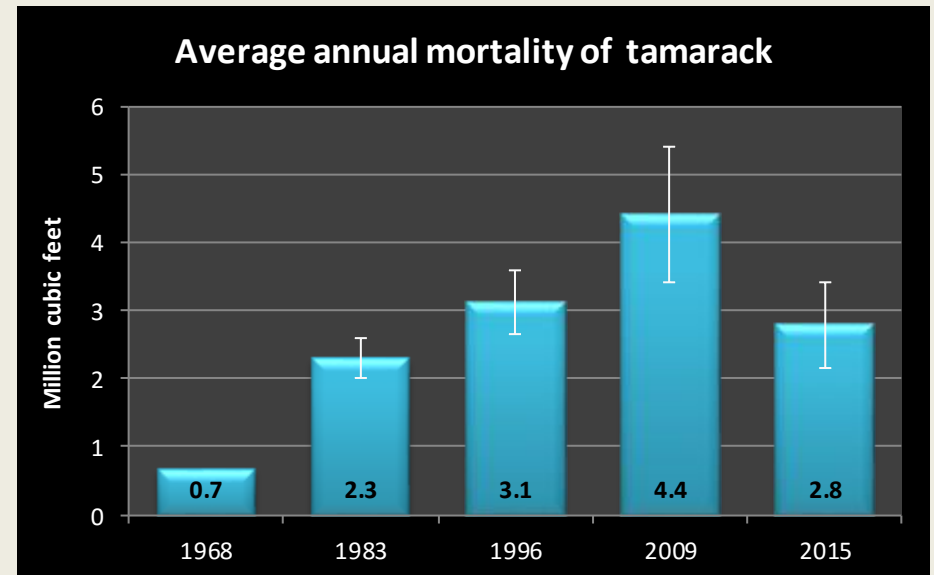




*"How healthy is tamarack in Wisconsin?"*  
**Average annual mortality and the ratio of mortality to volume**

**A**verage annual mortality of tamarack from 2010 to 2015 was about 2.8 million cubic feet, or 1.2% of statewide mortality (chart on right). Because of high sampling error mortality may have remained unchanged since 1983.

**T**he ratio of mortality to volume is about 0.9% for tamarack. This is slightly lower than the average for all species in Wisconsin which is 1.1%.



Average annual mortality (million cubic feet) by inventory year.  
 Source: USDA Forest Inventory & Analysis data

Mortality, volume and the ratio of mortality to volume.

Species	Average annual mortality (cft)	Growing stock volume (cft)	Mortality / volume
Tamarack	2,784,513	325,193,439	0.9%

For a table of **Average annual growth, mortality and removals by region** go to:  
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>

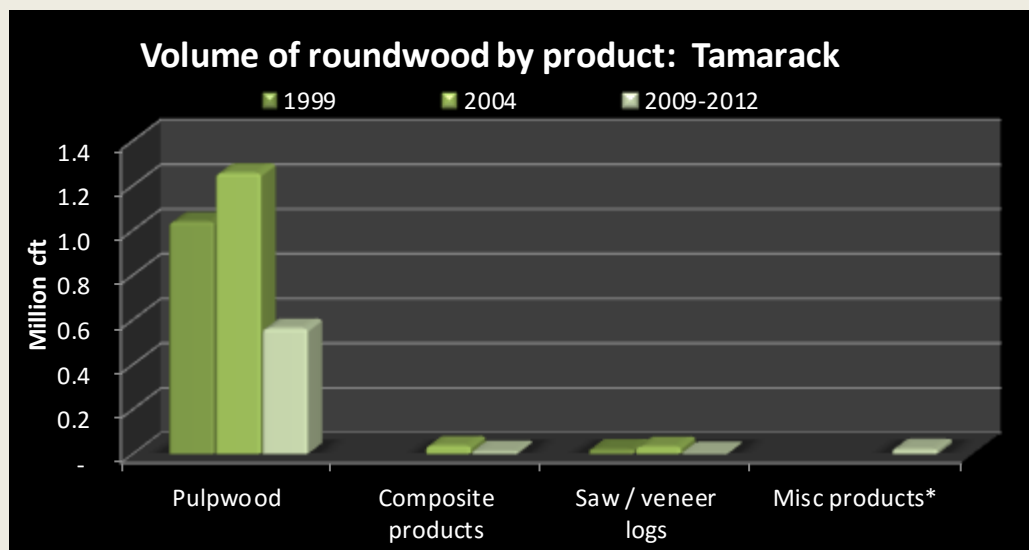


*"How much tamarack do we harvest?"*

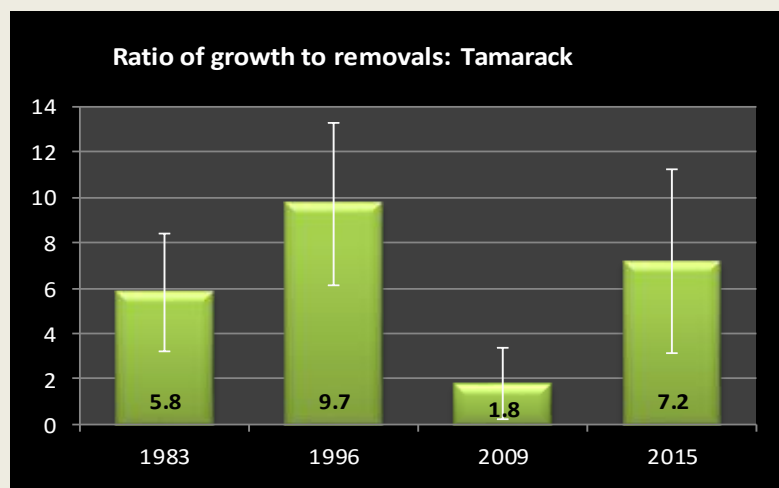
## Roundwood production and the ratio of removals to growth

In 2009-2012, Wisconsin produced about 275,000 cubic feet of tamarack roundwood, or about 0.1% of the total harvest (chart on right). Tamarack roundwood production has decreased 86% since 2004.

Tamarack is used mostly for miscellaneous products such as poles, posts and pilings.



Volume of roundwood. Most recent figures for pulpwood and composite products are from 2012 while other product volumes are from 2009. \* Miscellaneous products include poles, posts and pilings.  
Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN



Source: USDA Forest Inventory & Analysis data

We remove about 1.2 million cubic feet of tamarack volume each year. Tamarack accounts for 1.5% of volume and growth but only 0.4% of removals statewide.

The ratio of average annual net growth to removals is 7.2 for tamarack, much higher than the statewide average of 1.7 (chart 7). Due to very high sampling error, it's difficult to identify verifiable trends.

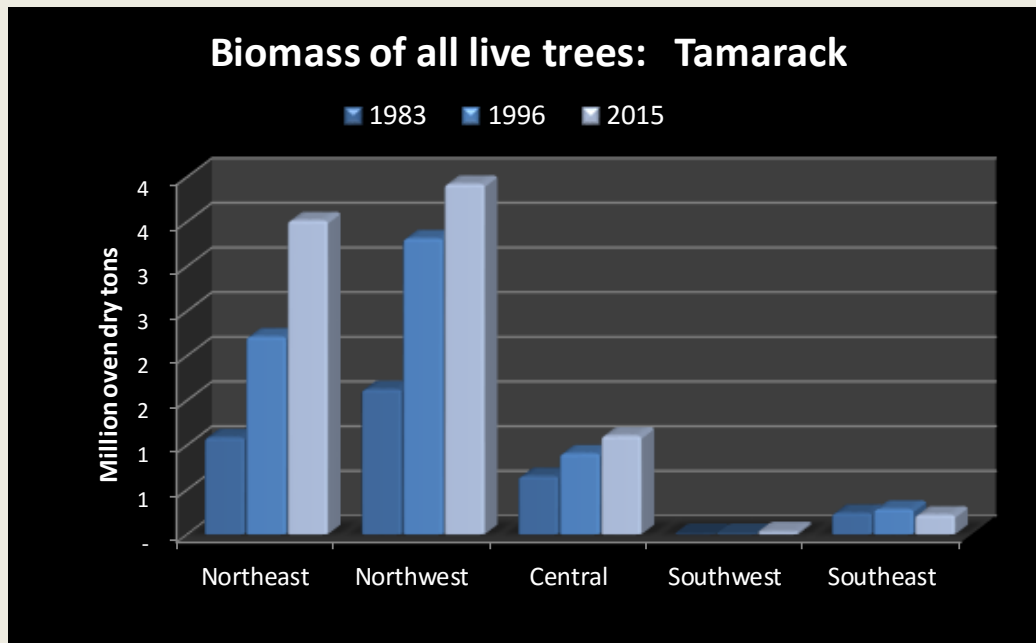
For a table of **Average annual growth, mortality and removals by region** go to:  
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>



## *"How much tamarack biomass do we have?"*

### Tons of aboveground biomass by region of the state

There are 8.8 million short tons of aboveground [biomass](#) in live tamarack trees, an increase of 144% since 1983. This is equivalent to approximately 4.4 million tons of carbon and represents 1.4% of all aboveground biomass statewide. As with volume, most tamarack is located in northern Wisconsin (chart 9).



Biomass (above ground dry weight of live trees >1 in dbh, short tons) by year and region of the state.  
Source: USDA Forest Inventory & Analysis data

**Tamarack** has the lowest density of any of the commercial tree species in Wisconsin, with a ratio of biomass to volume of 22 oven-dry lbs. per cubic foot. The average for all softwoods is about 26 ODP/cubic feet and for all species is 33 ODP/cubic feet. Approximately, 74% of biomass is located in the bole and 13% in the top branches.

For a table of **Biomass by County** go to:

<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/BiomassByCounty.pdf>

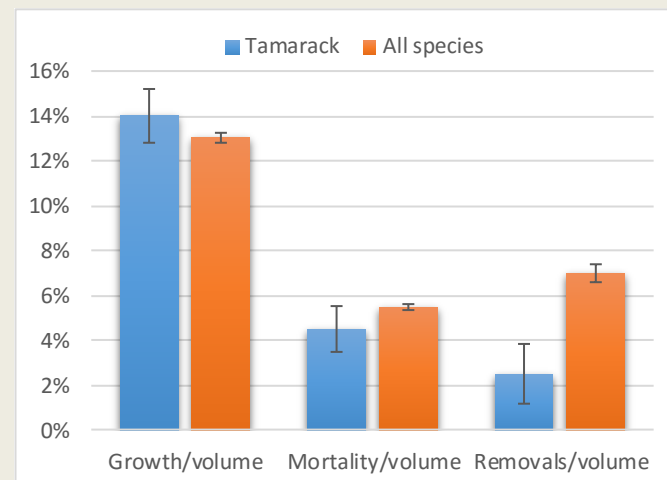


## *"Can we predict the future of tamarack?"*

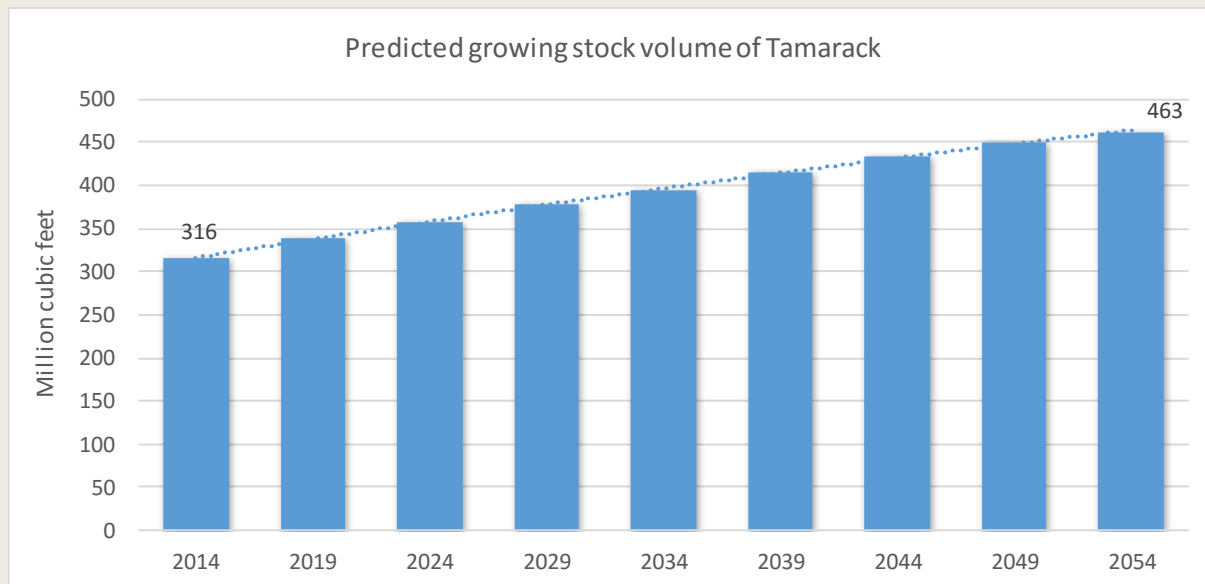
### Predicted volumes based on current rates of mortality and harvest

The 5-year ratios of growth and mortality to volume are not significantly different from the average for all species but the ratio of removals to volume is much lower for tamarack (chart on right). The fact that mortality and removals are so low means that volume will probably increase in the near future.

The Forest Vegetation Simulator (FVS<sup>1</sup>) was used to predict future volumes of tamarack through 2054 using current mortality and removal rates.



Five year ratios of growth, mortality and removals to volume.  
Source: USDA Forest Inventory & Analysis data



The volume of tamarack increases 46% by 2054, with no indication of a leveling out before then (chart on left).